

REMARKS

Applicants' invention is a novel method for cooling superconducting cable wherein refrigerant fluid is cooled by heat exchange with saturated liquid cryogen which has been flashed into a vacuum vessel to a temperature lower than its normal saturation point. The thus cooled refrigerant fluid is then employed to provide cooling to the superconducting cable. Claim 7 has been amended to more particularly point out and distinctly claim the invention be reciting that the stored liquid cryogen and the cooled liquid cryogen are each at saturated conditions. These saturated conditions enable the efficient operation of applicants' novel method. In applicants' method which uses operation under saturated conditions, subcooling, also known as supercooling, is not employed. Support for the amendments to claim 7 is found at page 5, paragraph 22.

The Rejection

Claims 7-9 were rejected under 35 USC 103(a) as being unpatentable over Wieland (U.S. 4,510,760) in view of Nakahara et al (U.S. 6,354,087) and claim 10 was rejected under 35 USC 103(a) as being unpatentable over Wieland and Nakahara et al. further in view of Daunt (U.S. 3,354,662). These rejections are respectfully traversed.

Wieland discloses a gas phase separator and subcooler system which employs neither flashing nor saturated operation. In the Wieland system liquid cryogen is provided through inlet tube 13 and passed out through outlet tube 15 without any flashing (see, for example, column 2, lines 39-43 wherein the liquid enters and exits at the same pressure). Some of the liquid is vaporized but only by heat exchange against other liquid, not by flashing (column 2, lines 44, 45). The liquid is subcooled and the resulting vapor is vented to the atmosphere (column 2, lines 22-24). The vapor is not pumped out of the container. Again this further establishes that the liquid cryogen of the Wieland system does not undergo flashing under saturated conditions into a vacuum vessel.

In summary, Wieland fails to disclose or to suggest passing saturated liquid cryogen to a vacuum vessel and flashing a portion of the saturated liquid cryogen into the vacuum vessel to produce vapor and cooled saturated liquid cryogen. These important aspects of applicants' invention, as well as the

advantages attainable thereby, are described in greater detail in paragraph 22 of the specification.


Neither Nakahara et al. nor Daunt provide anything material to overcome the deficiencies of Wieland discussed above. Accordingly, applicants respectfully submit that their claimed invention is patentable over the combination of Wieland and Nakahara et al. or the combination of Wieland, Nakahara et al. and Daunt.

Applicants confirm that the subject matter of all claims was commonly owned at all times.

Applicants acknowledge the recitation of Laskaris (U.S. 6,553,773), Broderdorf et al. (U.S. 5,156,006) and Prost et al. (U.S. 4,175,395) which were not applied against the claims. Suffice it to say that none of these references discloses or suggests applicants' claimed invention.

In view of the foregoing, it is respectfully requested that the application be reconsidered and that all of the pending claims be allowed.

Respectfully submitted,



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